

**REMARKS**

By this Amendment, claims 1-2 have been amended and are pending in the present application.

Applicant wishes to thank the Examiner for the courtesy extended to Applicant's attorney during the telephone conferences of January 20 and January 25, 2010. During the telephone conferences the amendments to the claims made herein were discussed, as well as the criticality of the claimed 1-2mm overlap prior to deflection limitation. No ultimate agreement was reached on allowance of the pending claims.

The objection to and rejection of claims 1 and 2 under 35 U.S.C. §112, first and second paragraphs, are noted. In response, the claims have been amended to overcome the objections thereto and be in full compliance with all §112 requirements. Accordingly, reconsideration and withdrawal of the objections and §112 rejections to the claims is respectfully requested.

Claims 1 and 2 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,490,836 to Moriau et al. Applicant respectfully traverses this rejection.

Among the limitations of independent claim 1 which are neither disclosed nor suggested in the prior art of record is a fracture-proof flat clasp floorboard piece wherein "the upper surface of the slot mortise overlaps the upper surface of the tenon of the another floorboard from 1-2 mm prior to deflection of the lower surface of the slot mortise and before the self-locking surface is formed as the pair of floorboard pieces are attached horizontally relative to each other."

As admitted on pages 6-7 of the Office Action, Moriau et al. fails to disclose the claimed range of 1-2 mm overlap prior to deflection, but contends that such a range would have been obvious given the disclosure of Moriau et al. Applicant respectfully disagrees, and submits that the overlap range of 1-2mm is a critical to preventing floorboard breakage during horizontal assembly, and that Moriau et al. does not disclose or even suggest such an overlap range. Rather, as described

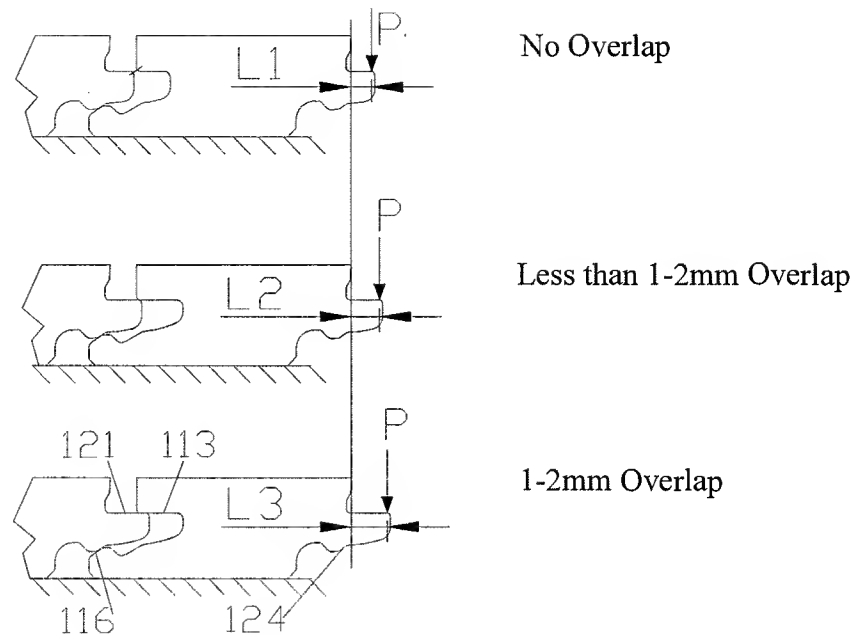
in further detail below, Moriau et al. teaches that the lower portion of the mortise deflects prior to any overlap of the tenon and mortise when the Moriau et al. floorboards are assembled horizontally.

#### Criticality of the 1-2mm Range

When floorboards are installed, the joints created must be tight and neat, and their longitudinal deformation, transverse deformation, height error, and joint gap need to meet corresponding manufacture and installation standards. If these standard requirements are not met, the floorboard will be considered a disqualified product. For example, if there is foreign matter between the tenon contact face and the slot mortise contact face, or local plastic deformation occurs during transport or installation, the tightness and neatness at floorboard joints will be directly affected, and cracks may occur in installed floorboard, thereby disqualifying the product.

Applicant has discovered that the tenon length has a direct effect on flexural stresses encountered when floorboard pieces are assembled horizontally. In floorboards, when the flexural stress is unchanged, the larger the length  $L$ , the smaller the pressure  $P$ . In other words, there is an inverse proportional relationship between the pressure  $P$  required to bend the floorboard tenon and the tenon length  $L$ . Assuming the same floorboard material, the longer the tenon, the easier elastic deformation (bending) will occur. Thus, in floorboard structures that adopt a tenon-slot mortise engagement, the tenon structure of a smaller flexural strength is easier to guide into the slot mortise to achieve full engagement. The below Fig. A shows three different tenon lengths that were examined by Applicant; no overlap; less than 1-2mm overlap and 1-2mm overlap.

FIG. A



As shown in the below Figs. B1-B3, when there is no overlap between the upper surfaces of the tenon and the slot mortise before deflection of the lower surface of the slot mortise during horizontal assembly, the floorboard is damaged during installation. Specifically, when assembled horizontally, the tenon moves along the slot mortise's beveled surface the front end of the tenon is pushed against the slot mortise (Fig. B2). If a horizontal force is continued to be applied, the front end of the tenon and the end of the slot mortise are damaged and the tenon cannot be guided into the slot mortise (Fig. B3). As such, correct installation of the floorboard cannot be accomplished when there is no overlap between the upper surfaces of the tenon and the slot mortise before deflection of the lower surface of the slot mortise during horizontal assembly.

Fig. B1

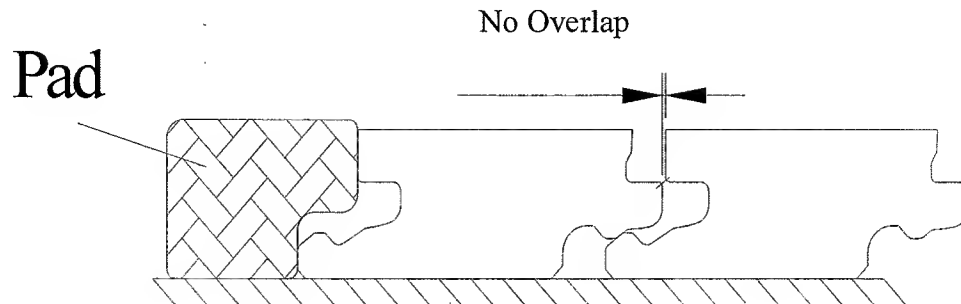


Fig. B2

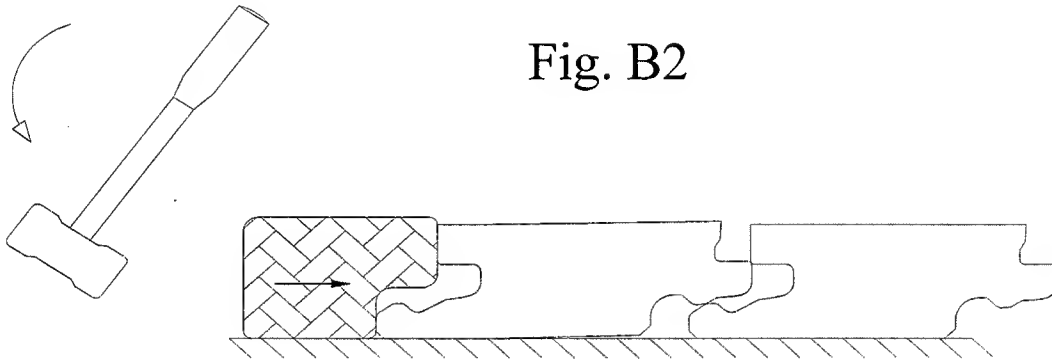
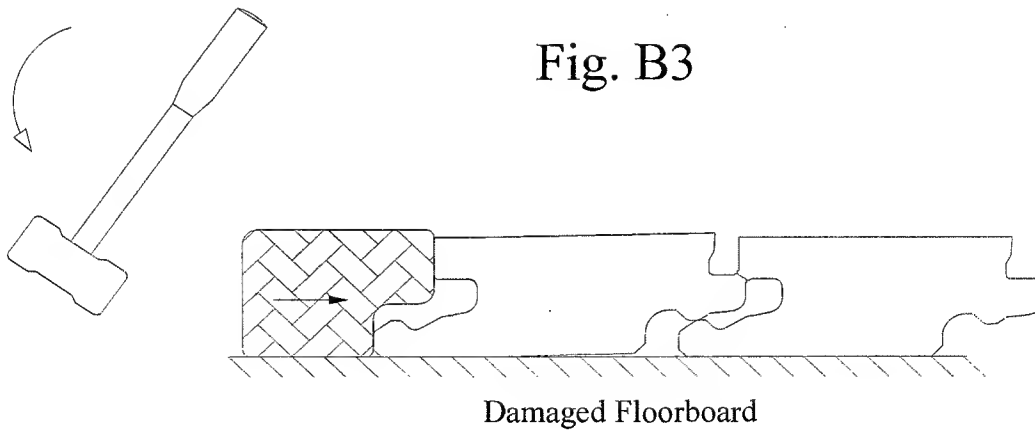


Fig. B3



As shown in the below Figs. C1-C3, when there is less than 1-2 mm overlap between the upper surfaces of the tenon and the slot mortise before deflection of the lower surface of the slot

mortise during horizontal assembly, the floorboard is damaged during installation. Specifically, when assembled horizontally, the tenon moves along the slot mortise's beveled surface contact area between the upper surface of the tenon and the upper surface of the slot mortise is small (Fig. C1). If a horizontal force is continued to be applied (Fig. C2), the small contact area will cause excessive local pressure to be applied, sharply increasing the friction resistance on the contact area, and thereafter causing local plastic deformation (damage), as shown in Fig.C3. In particular, the contact between surfaces 121 and 113 in Fig. C2 cause bulging deformation, which directly affects the tightness and neatness of the floorboard joints, and results in deformation and cracking at such joints. As such, correct installation of the floorboard cannot be accomplished when there is less than 1-2 mm overlap between the upper surfaces of the tenon and the slot mortise before deflection of the lower surface of the slot mortise during horizontal assembly.

Fig. C1

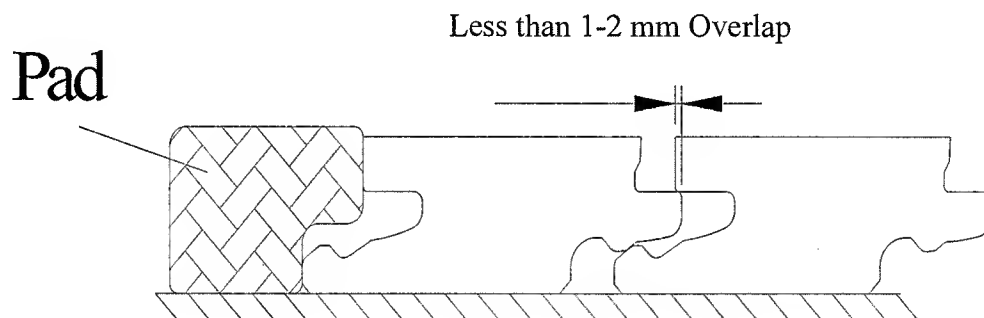
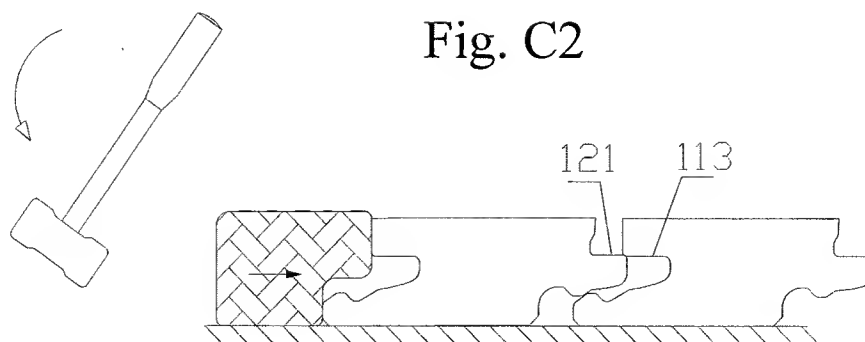
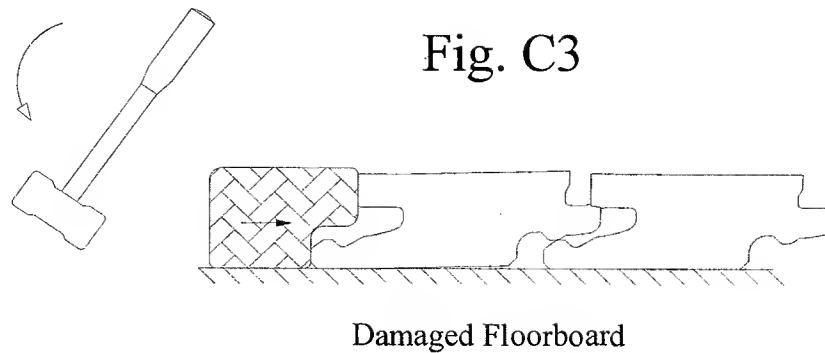


Fig. C2





However, as shown in the below Figs. D1-D3, when there from 1-2 mm in overlap between the upper surfaces of the tenon and the slot mortise before deflection of the lower surface of the slot mortise during horizontal assembly, the floorboard is not damaged during installation. When assembled horizontally, the tenon moves along the slot mortise's bevel surface 116 and a pressing force is generated between plane 113 and plane 121 (Fig. D1). During the continued horizontal assembly, the tenon front end will be experience downward elastic bending deformation and the slot mortise will be subject to upward elastic bending deformation (Fig. D2). Specifically, during the process of the tenon being guided into the slot mortise, pressure generated on the tenon upper surface and the slot mortise upper surface acts on sufficiently large contact area, thereby dispersing the pressing force and avoiding excessive pressure and friction resistance. That is to say, no plastic deformation occur on the tenon and the slot mortise contact surfaces. As such, the tenon can be smoothly guided into position in the slot mortise after being subject to elastic deformation, and then restored to its original position (Fig. D3). Therefore, correct installation of the floorboard is accomplished when there is from 1-2 mm overlap between the upper surfaces of the tenon and the slot mortise before deflection of the lower surface of the slot mortise during horizontal assembly.

Fig. D1

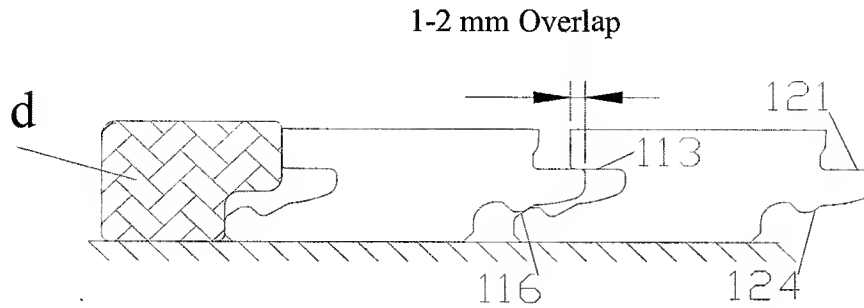


Fig. D2

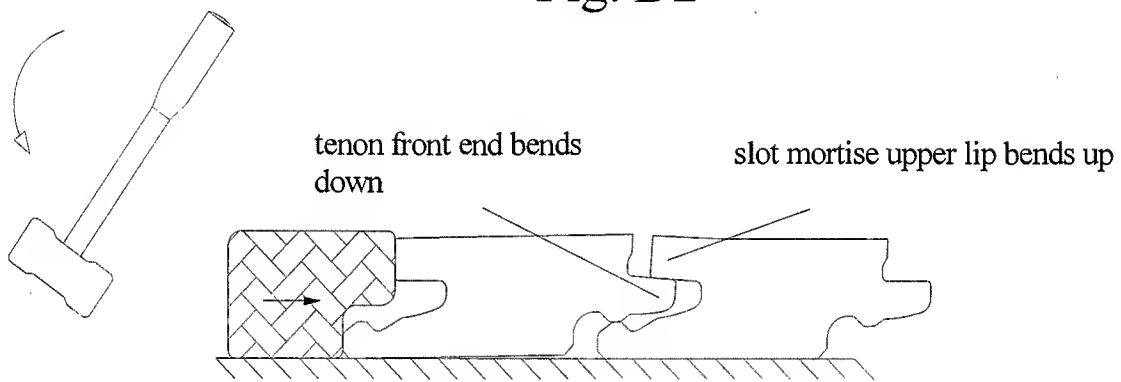
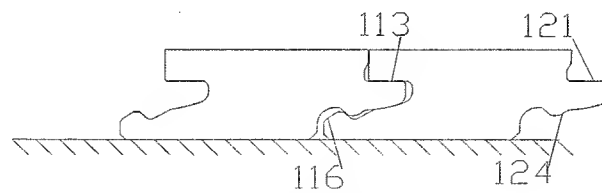


Fig. D3



Undamaged Floorboard

As discovered by the Applicant, and shown above, before the tenon needs to be guided into the slot mortise by a depth of 1-2mm during horizontal assembly so as to avoid damage to the floorboard and ensure a smooth installation.

The Moriau et al. Reference

Nowhere does Moriau et al. disclose or suggest that “the upper surface of the slot mortise overlaps the upper surface of the tenon of the another floorboard from 1-2 mm prior to deflection of the lower surface of the slot mortise and before the self-locking surface is formed as the pair of floorboard pieces are attached horizontally relative to each other” as required by independent claim 1.

A review of Fig. 25 of Moriau et al., and the corresponding description thereof in the specification, shows that Moriau et al. does not recognize that there is a correlation between the claimed overlap prior to deflection of the lower portion of the slot mortise and reduction of breakage of the floorboard. Specifically, it is unclear in Fig. 25 of Moriau et al. that there is any overlap between the tenon and slot mortise because Fig. 25 explicitly shows a first chain-dot line which appears to teach that there is no overlap between the tenon and upper portion of the slot mortise before deflection of the lower portion of the slot mortise. Moriau et al. simply does not recognize that an overlap range of 1-2mm produces any particular result, let alone the result discovered by Applicant. Without such an indication, it would not be a matter of obvious design choice to modify Moriau et al. as suggested in the Office Action. See MPEP §2144.05 II.B.

Accordingly, it is respectfully submitted that independent claim 1 patentably distinguishes over the art of record.

Claim 2 depends directly from independent claim 1 and includes all of the limitations found therein, as well as additional limitations which, in combination with the limitations of claim 1, are neither disclosed nor suggested in the art of record. In particular, Moriau et al. does not recognize that making the long end of the side wall of the slot mortise 2-4mm longer than the short



end produces any particular result. Without such an indication, it would not be a matter of obvious design choice to modify Moriau et al. as suggested in the Office Action. See MPEP §2144.05 II.B. Accordingly, claim 2 is likewise patentable.

In view of the foregoing, favorable consideration of the amendments to claim 1 and 2, and allowance of the present application with claims 1 and 2 is respectfully and earnestly solicited.

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Respectfully submitted,

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